XXIV. *A Contribution to the Life History of* Hesperia sidae, *Esp.* By Harold Powell, F.E.S.

[Read May 3rd, 1911.]

Plate XLVII.

This is a very local skipper, and is never abundant even where it occurs. It is found in moist parts (not marshy) of certain valleys in S.E. France as well as in Italy, eastern Europe, and Asia. I have come across it in several places in the Dept. Var, both on limestone and schistous ground.

In the commune of Hyères it occurs in the Vallon de la Monière, where it is very scarce now, and in the valley of the Plan du Pont, where it is more abundant, though in the height of its season a bag of ten or fifteen specimens in one day is a very good one. In the Hyères district it flies from the end of April to about the 20th of May.

For many years I had been hoping to find out something about its life history, which, I believe, is so far unknown, but it was not until 1909 that I got an opportunity to spend some time in its locality at a time when the imagines were flying.

On May 5 of that year I went over the hills to the Plan du Pont valley with the intention of getting the egg and discovering the food-plant if possible. On this day I found *sidae* well out, nine of the eleven specimens taken being quite fresh, one ♂ and one ♀ having their wings still weak and hardly dry. It is decidedly local in its habit, keeping pretty closely to certain parts of the valley, and never straying to the hillsides enclosing it.

As the family *Rosaceae* furnishes food-plants for most of the species of the genus, I first looked round to see what Rosaceous plants were growing in *sidae's* special haunts.

Two species of *Rubus* were common, also *Poterium sanguisorba* and, more locally, *Potentilla hirta*, L. I saw

Hesperia sao ovipositing freely on the flower heads of *Poterium*, but, although I watched three ♀♀ of *H. sidae* for as long as it was possible to keep them in sight, they made no attempt to lay eggs. They were probably too fresh and had perhaps not mated.

Their flight is very rapid and erratic, and they were easily lost sight of. One may be seen coming up the path between the narrow strips of prairie, in its rapid, jerky way, and it may perhaps settle, but when approached it is off again with a whirr of wings distinctly heard, and is quickly lost in one of its long zigzags. If one stays in the same place it will very probably be seen returning after a while, for *sidae* does not wander far from its "run."

However, if I did not see the skipper in the act of egg-laying on that day, I got as far as the fact that it only flew where the *Potentilla hirta* grew, and that plant, as I have already said, was local, though it grew abundantly enough in patches. I found only two or three plants in flower, though it was evident that in a day or two it would be flowering generally.

I did not return to the valley until May 14. In the meantime the weather had been mostly fine and warm, but the 10th, 12th, and 13th were wet. The *Potentilla* was then flowering well, and there were as many *sidae* about as on the previous occasion. I again took two freshly emerged specimens, but most showed signs of wear. I recognised a crippled specimen which I had seen on May 5. Although the yellow bands of the hindwings beneath had faded, its fringes and general appearance above were still good.

Soon after reaching the ground, I saw a ♀ seemingly feeding on a *Potentilla* flower, but she went off at once across the stream. I kept her in sight, and she soon returned to the *Potentilla* patch, settling on a flower on which I supposed she meant to feed, but I saw her, with wings still open, curve her abdomen until the extremity touched the flower. She kept it there for a few seconds and then flew off again. Picking the flower, I found an egg amongst the stigmata, nearly in the centre. I saw another egg laid in the same way, and then I lost sight of the ♀. Having got so far, the rest was easy. I set to work to examine the flowers, and soon found a number of eggs. On three occasions I found two eggs on one flower, but the usual habit

seems to be one egg only: and at any rate not more than one egg is laid at a "sitting."

Some of the flowers were over, the petals had fallen and the calices had closed up over the centres. On pulling these open I often found eggs inside. Most of the flowers were overrun with small beetles of several kinds and Thrips species, but these did not seem to interfere with the eggs.

A little after 2 p.m. I saw another ♀ *sidae* busy on an isolated patch of *Potentilla*. She left when I came near, and, on carefully examining the flowers of this patch, I found no eggs, with the exception of two on a head closed up by the calyx. These had evidently been laid before her time by some earlier ♀. However, whilst I was still searching, she returned, and I had the satisfaction of seeing her settle on the stem of a plant and lay an egg on the underside of a leaf nearly half-way between the flower head and the ground. This particular ♀ had no doubt laid most (if not all) her eggs in this way, which would account for my finding none on the expanded flowers of the patch.

The flower seems to be preferred as a resting-place for the egg. I found forty-five laid on the stigmata, one on the underside of a leaf, and, on examining a stock of plants I brought home, two more were found on the calyces of unopened flowers. Males are generally to be met with along a rather wide path running down the valley in which the *Potentilla hirta* grows. They apparently divide this path into sections, each male keeping pretty much to his section, up and down which he flies, or rests with expanded wings on a bush or flower on the narrow strips of prairie bordering the path.

Should another male venture upon his section he will attack him, and a very rapid chase follows. It is almost impossible to keep the skippers in sight during such a chase.

He will also attack any other skipper that may come by, or almost any fast flying butterfly, in fact, but in these cases the chase is soon abandoned.

The pursuit of a ♀ of his species is equally rapid, and may take him further away. The ♀ ♀ are more often seen in the fields overgrown with wild stuff than on the path.

Ovum :

Shape.—Squat, greatest horizontal diameter at a point nearer the base than the top. The base is broad, rounded off, and with a shallow central depression. The upper portion of a flattened dome shape ; micropylar cup fairly broad but not very deep. Height, ·7 mm.; greatest width, ·6 mm.

Sculpturing.—About 21 main ribs start from near the base and run up rather irregularly towards the rim of the micropylar cup, but sometimes two will join together on the way up, so that fewer reach the rim than left the base. Some do not go beyond the junction. These ribs sink and disappear before the base is reached. Base fairly smooth. Between the main ribs are the usual smaller transverse ribs, forming oblong, irregular cells. They also diminish in height towards the base. In the centre of the micropylar cup is a rosette of very small cells, which appears to be slightly raised. The ribs are not sharp-edged, and though very distinct, are not high.

Colour and Surface Appearance.—When first laid they are almost pure white. The next day they are very pale creamy white and pearly. Some found which had certainly been laid several days before, did not differ much from eggs just laid. On May 17th I found that all the eggs had turned a pale orange yellow, and that those on the flowers were more difficult to see in consequence. They were generally well sprinkled with pollen.

On May 19th the orange-yellow colour was rather deeper. The colour did not deepen after this, but about a day before hatching the black head of the larva, showing through the eggshell, formed a large, dark leaden patch at the top.

An egg which I saw laid on May 14, hatched between the afternoon of May 22 and the morning of the 23rd. Most of the other eggs hatched on the 23rd, which makes it probable that few of them could have been very long laid when I found them on the 14th.

The larva eats a large circular piece out of the top of the egg, but after emerging it does not finish up the egg-shell. It is active and restless, spinning silk as it moves about. One under observation has settled down on a division of one of the upper leaves, and is drawing the edges together with silk. The green tinge of the body of another specimen shows that it has already fed.

First stage.—The colour of the body is straw yellow before the young larva has taken its first food. I made some notes on May 30th on a specimen which was then resting for the first moult. They are as follows :—

Length : 3·5 mm. Head, heart-shaped, rather flat in front, shiny black. Plate on prothorax rather long and narrow, dark brown. Colour of body, dull yellowish brown. The dorsum is much wrinkled by subsegmentation. It has a faint stripe down the centre, darker than the ground colour, and with a more shiny surface than the rest of the body. There are no other lines or markings visible to the naked eye, but the microscope shows a good deal of mottling arranged roughly in lines, and somewhat similar, though weaker, to that seen in some Noctuid larvae (Catocalids, for instance). The skin is shiny. It is rather thickly covered with small, dirty whitish blotches, too numerous to be *all* primary tubercles, though these are similar in appearance. The hairs (rather long, whitish to the naked eye, colourless under microscope) grow from the primary tubercles. They are curved forward on head and on the prothorax, and are plain. On the abdominal segments they are bifid, forming a Y. One hair only, to each tubercle.

Second Stage.—The same larva was resting for the second moult on June 7th, and I then made the following notes :—Length : 5·5 mm. Head entirely black. It is still heart-shaped, particularly with regard to the upper part, the lobes being well divided at the top of the head. It is pitted, and at the same time covered with shallow, irregular, wrinkled cells. It bears numerous short, whitish-brown hairs, and a few longer ones above the mouth parts and around the ocelli. The head is rather small in proportion to the body, which is plump and has much the shape of that of the larva of *Carcharodus alceae*, tapering rather abruptly towards the anal extremity. Prothoracic plate, black, resembling two short strips of black court plaster, one strip on each side of the dorsal centre, with small suffused break between. The neck is slender. Colour of body pale brownish. There is a distinct dorsal line of a darker brown colour, and outside that a considerable amount of brownish mottling, darker than the ground colour, and arranged in irregular longitudinal lines. The tubercles are small, dull white pimples, most of them bearing a single, rather short hair very slightly tinted brown. The hairs are more numerous, but proportionately shorter than in the first stage, and are no longer forked but spatulate, gradually increasing in width from the base upwards, the increase being more rapid towards the free extremity, which is cut off level or sometimes slightly split down the centre. The *long* hairs on the head are tapering, not spatulate. Those on the sides of the body are less frequently spatulate, particularly the longer hairs, which are curved backwards. The lateral area has also considerable brownish mottling.

The true legs are black. By transparence they are greyish black.

The spiracles are pale brownish discs set in slight depressions surrounded by wrinkles. The segmental incisions are well marked. When active in this stage, that is to say after feeding has commenced and before the preparation for the second moult has suspended activity, the larva has a greyish-green tinge due to the presence of food in the alimentary organ. At other times the larva to the naked eye is of a pale coffee-brown colour. The microscope breaks this up into paler, semi-transparent ground colour, and darker mottlings, and shows the dull white tubercles. The larva still feeds on the cuticle, not attacking the entire leaf substance. It draws together the edges of the leaf division in which it lives.

On June 9 I left Hyères for the Aisne Department, taking with me three larvae in a glass tube, two being in the 2nd stage and one in the 3rd. Whilst away from Hyères I fed these larvae on a common *Potentilla*, forming close growing patches on sandy soil. It had a slightly hairy leaf. They took to it without any hesitation. (At Samoussy I noticed *H. carthami* frequenting patches of this *Potentilla*.)

Progress was very slow. On my return on July 1 the larvae were still in the same stages, though they had grown considerably. In changing their food I removed them each time from the tents they made with the leaves, and after cleaning the tubes replaced them with some fresh leaves. Each one set to work at once to spin up a new tent, drawing together the edges of a division, or uniting two divisions to form a fairly roomy living-place. When moving, the larva spins silk continually. I believe it to have an aestivating habit. In captivity in a tube, where conditions were always moist, the torpid state was never fully developed, but progress became slow, and little eating was done. The larvae nibbled bits out of the edges of the leaves of their tents.

I had left the rest of the *sidae* larvae at Hyères on growing plants of *Potentilla hirta* covered with muslin. Soon after leaving the eggs, those from ova laid in the flowers went down to the leaves. Here they progressed until the 3rd stage was reached in some cases, others not going farther than the 2nd stage. About that time the plants dried up from want of water. When I returned to Hyères the plants were dry and brittle, and I was quite prepared to find the larvae dead. However, on opening up the dried leaf divisions, I found them looking comfortable

enough and quite lively, inside. They resented being disturbed, and sought to get back into their cylinders of leaf as quickly as possible. Evidently they were lying up and had not eaten for a long time. They were shorter and plumper than those I had with me, and of a lighter, ruddier colour. Had they felt the need of food it is probable that they would have wandered away, or have gone down to the bases of the plants where a few fresh shoots were showing. The normal atmospheric conditions in the Hyères district are dry and hot after May 15, and it is usual for most herbaceous plants to dry up partially or totally during the summer, sending out in some cases fresh leaves after the September rains.

Larvae living upon them, that do not feed up rapidly, must therefore fast or be satisfied with tough or dried leaves. The *sidae* larvae are quite capable of doing without food for long periods in summer, and I think it likely that they really aestivate under normal conditions.

This is a description (July 7) of a fasting larva in the 3rd stage :—

Examined with Hand Lens.

Short and plump. It contracts to less than 5 mm. in length. Head entirely black, appears rather more rounded than in preceding stages, and less heart-shaped. It is thickly sprinkled with light-coloured, rather stiff-looking shortish hairs. Anal end of body tapering abruptly. "Neck" rather darker than the rest of the body. Prothoracic plate brownish black. Body light reddish-brown. There is a tendency to semi-transparence. Central dorsal line dark red-brown, narrow but distinct. Several somewhat indistinct subdorsal and lateral lines of the same colour, irregular and rather wavy. Ventral surface and prolegs light reddish-brown.

Examined with Microscope.

On a lighter, somewhat flesh-coloured ground there is a thick mottling of red-brown, forming several indistinctly limited lines between the central dorsal line and the flange. There are very numerous whitish, conical tubercles giving the larva a white-speckled appearance quite visible under hand lens even. Each tubercle bears a rather stiff, whitish hair, swollen towards the free extremity, and to some extent fish-tail shape. Those on the flange and on the last few abdominal segments are longest. Those on the head are not swollen at the end. Spiracles are almost round, light-brown rings, placed very high above the flange fold it seems to me. (This is perhaps characteristic of the *Hesperidae*.)

The larvae which have been kept in tubes have the ground colour much darker. They are coffee-coloured, in fact.

From July 8 to October 17 I was away from Hyères, travelling about most of the time in the Pyrénées Orientales. I had four larvae with me. Two of them, which I had kept in tubes from the 1st stage, fed slowly all through the summer, reaching, I think, the last stage or, at any rate, the one preceding it. They died in September from a fungoid disease which declared itself as a small black scar on the back of one of the abdominal segments. The scars did not appear to interfere much with the larvae at first, but after a week or ten days they fed much less, and finally ceased feeding altogether, though they remained plump. The one first attacked I found dead and stiff in the tube one day, quite a month from the time the disease first appeared. The other, in which the disease was already advanced, died soon after in the same way. The scars had enlarged considerably during the course of the disease. They looked like charred cork on the skin. Two other larvae which I put in tubes towards the end of July, and which had then not fed for fully six weeks, started to eat a *Potentilla*, which is common generally in ditches and along roadsides. The moister atmosphere of the tube and the presence of fresh food made them active. Before this they had been spun up in dried leaves.

In mid-September, fearing that they might share the fate of the other two, I put them on a potted plant of *Potentilla*, covered the plant with muslin and left them out of doors. They spun up between the leaves at once, and for a fortnight I saw signs of feeding on those leaves forming the sides of the nests. The smaller of these larvae dried up in its nest, and I found it dead before leaving Vernet. I brought the other back to Hyères on October 17 and put it on a growing plant of *Potentilla hirta* which I dug up at the edge of one of the quarries behind the Villa les Rossignols near Costebelle. The country was very dry at that time, only a little rain having fallen in September. However, I found the plant and others with plenty of green leaves around the bases of the dead flower stalks.

The larva, which was then in the 4th stage, spun up between two leaves without delay, and for a time it fed on them.

But after the beginning of November I saw no trace of

any fresh feeding, and on January 7, 1910, I noticed that the tent was still very well sealed up, as it had been for two months. The weather was very cold, with several frosts at the end of November and beginning of December, mild and damp from the middle to the end of December. It was fine and calm in January, with warm days and cold nights, there being sometimes a little frost. The winter tent is tightly closed by an inner lining of silk. It is not at all conspicuous. Three of the spun-up leaves composing it have died and are blackened; others are green and faded yellow.

At the beginning of March I opened this tent and found it empty. The larva had recently left it and had made a much larger tent on the other side of the plant. Five leaves had been drawn together for this purpose. The nest was well concealed. It was almost completely closed up by the silk work inside. Some of the divisions belonging to the tent leaves, and one or two adjacent leaves had gaps in them, showing that the larva had fed. It was then in its final stage (5th ?), but I could find no cast skin or head case in either the winter tent or in the new one. It was certainly not in this stage, however, when it went into winter quarters. The nests had hardly any frass in them.

Throughout the month of March the larva lived in the same nest. Although I kept as close a watch on it as was possible, I never saw it outside its tent or feeding. It ate very little; only a few free divisions of those leaves composing the tent and two other leaves near by bore any traces of feeding. I am not able to say at what time of day or night it feeds. It certainly did not leave its tent for long at a time. Its movements were slow when disturbed, and were always preceded by much silk-spinning.

At the beginning of April the larva was well advanced in the last stage. On April 3 I made some notes on its appearance. It was then 20 mm. in length. Width of head 2·75 mm.

Head rather large, each lobe top rising slightly above the central division but not enough to give the appearance of horns; it is rounded, with no sharp angles; colour uniform dull black, surface granular; labrum pale yellow, shiny; antennae and jaws black. The head is covered with rather short, stiff-looking brown hairs, and a few much longer hairs with a bend in them. These hairs, four or

five times as long as the short hairs, are developed from the primary head tubercles. The chitinous parts of the feet are jet black, the joints and bases dirty whitish yellow. Neck narrow, quite smooth and of a light sepia colour. The rest of the prothorax is smooth with the exception of the black transversal plate divided by the dorsal centre. Each half of this plate extends from the dorsal division to the level of the prothoracic spiracle. It is somewhat shiny, and bears several stiffish hairs curved forward. The division is a narrow, dull white line, continued on the succeeding segments as the brownish-black dorsal line.

The form of the body is similar to that of *Carcharodus alceae*. The body is capable of great extension and contraction. The segmental incisions are well marked but not very deep. Body tapers rather rapidly after abdominal segment 6. Anal flap flattened and rounded. The colour of the body is something between sepia and coffee colour, darker on the dorsum than beneath. The central dorsal line is dark brown, darker than the ground colour, but the contrast is not sufficient to make the line very striking or distinct. There are signs of two other dark lines between it and the spiracles. They are very much suffused. Under the hand lens the dorsum appears thickly sprinkled with dull whitish tubercles bearing light brown hairs of different lengths, none being more than about 1·5 mm. The white hairs of the food plant are often caught in these hairs. On the first two abdominal segments a distinct though narrow, dull orange spiracular line is seen. It becomes very faint on the 3rd abdominal segment and is hardly distinguishable beyond that. No trace of this line on the thoracic segments. The flange has a semi-transparent appearance when seen from below, and is brownish-orange, rather lighter than the general ground colour.

The roundish-oval chitinous ring of each spiracle is set on a small mound of dull brownish orange. The ring itself is light red-brown. The bases of the prolegs are slightly darker than the surrounding tissue. They are hairy.

Under microscope × 40 approx., one sees that the numerous whitish tubercles covering the upperside of the body resemble to some degree those of Pierid larvae. Many of them terminate in a shallow cup from the centre of which a hair grows. The edges of the cup appear chitinous. Amongst these upstanding tubercles are a few considerably larger cups or lenticles set on truncated tubercles. Judging from their position, they may represent the primary tubercles; but if this be the case the tubercles have undergone considerable modification. These large cups have very neat circular borders of brown-black chitin. They look, in fact, somewhat like

spiracles, but they are quite round and have no visible vent. No hairs grow from them.

The hairs are slightly swollen at their free extremities.

The larva of *H. sidae* has a habit of ejecting its excrement with violence, throwing it a considerable distance away. I observed this operation on several occasions.

The excrement was expelled gently until nearly the whole mass had appeared, then suddenly it was shot away, falling as nearly as possible 50 centimetres from the larva.

I did not notice any movement on the part of the larva which would account for this, but Dr. Chapman tells me that Hesperid larvae are provided with an internal comb which enables them to get rid of their excrement in this way. The comb must be worked by a strong muscle. I had the larva out of its tent when this performance took place, but when inside the tent the end of the body is no doubt pushed out, and that would account for the very little frass found in the nests. There was particularly little in the spring tent in which the larva has been living since it left its winter quarters. The larva was taken out of its tent, early in April, to be photographed. This was not an easy matter, as it is very restless when interfered with, and seeks to hide itself under the leaves, especially when exposed to sunlight.

As soon as the operation was over it was put back into the tent, but it did not stay there this time, for I found, a day or two afterwards, that it had made a new, roomy dwelling-place. To do so it had bitten right through the stems of two leaves, arranging them upside down to fill up gaps, and binding them with strong silk strands spun on the inside, to the other leaves entering into the composition of the tent.

On April 14, Dr. Chapman, searching on the *Potentilla hirta* plants in the Plan du Pont valley, found a 4th stage larva of *H. sidae* in its tent. It was small, about the size of my larva when it went into winter quarters last November. The tent it was in was not a winter nest but a new spring tent.

It seems probable from this that the insect passes the winter normally in the 3rd or 4th stage, but, as the larva subsequently proved to be ichneumoned, it can hardly be regarded as a normal larva, and may have been retarded

by the parasite. Dr. Chapman has found that ichneumoned larvae are sometimes stimulated into more rapid growth by the parasites, but there are also cases in which an opposite effect is produced, and this looks as though it might be one.

Dr. Chapman very kindly handed the larva over to me.

It had the dark dorsal line more distinct than in my 5th stage specimen. There is a fairly distinct, whitish, double subdorsal line swelling out slightly on each segment and contracting towards the incisions. The ground colour is rather lighter than in my specimen. With the microscope I see that the double, white subdorsal line consists mainly of large, white, hair tubercles arranged in rather irregular line. The hairs seem a little darker than in the other larva. The lenticles are not numerous. There is one well outside the central dorsal line on the first subdivision of the abdominal segments and another on the lower edge of the white subdorsal line on the third subdivision. Thoracic plate (scutellum) black and shiny, more conspicuous than in the larger larva. Lateral area with a dull orange suffusion along the abdominal segments. This caterpillar made a small tent in the *Potentilla* leaves and shut it up pretty closely.

Opening the tent on April 21, I found the larva dead. Its skin was inflated by the cylindrical cocoon with rounded ends, of an ichneumon. The cocoon had not broken through the larval skin, which was now dark grey, lighter on ventral surface, and with two suffused black dorsal blotches. From the dead larva a small ichneumon emerged on May 2, through a hole it made in the skin.*

The full-grown larva which I had reared from the egg, settled itself for pupation about April 19. It had not then changed colour.

On April 21 the whole dorsal and ventral area had become dull reddish, with the exception of a livid, whitish patch on the sides of the thoracic segments. This patch was sharply defined on its upper edge where it met the dull red colour of the dorsum.

The plant had been exposed to the sun, and I feared that, in spite of its thick tent, the larva had been killed by overheating, for caterpillars that have been killed by

* Mr. Claude Morley reports this specimen is a species of *Limnerium*, a male, and that its "pupa looks as though the *Limnerium* were hyperparasitic on *Rhogas* sp."

heat often show the same reddish tint. However, I soon discovered that it was quite lively, moving the fore part of its body from side to side when touched. It was well attached to the silk lining the nest by the hooks of the anal pair of prolegs. There was no other attachment.

The pupa had formed by the morning of April 22. It was fixed to the silk by the cremastral hooks, and the larval skin, shrunken to a small wad, was tucked under the abdomen near the end of the body.

The pupa is thickly covered with a white, floury substance which hides its real colour. When this is rubbed off, the wing cases are seen to be of a shade between putty colour and light mahogany; thorax, head and abdomen mahogany, the abdomen lighter beneath. Cremaster dark mahogany.

Shape.—Head large and broad; eyes large and prominent. Thorax broad, rounded, not very prominent; cremaster long, with a very slight ventral curve. The proboscis, leg and antennae cases are fairly prominent. The proboscis exceeds the apices of the wings, reaching to the posterior edge of the 4th abdominal segment. The upper line of profile when the pupa is lying on its back, runs up gradually to the 3rd abdominal segment (under wing cases), after which it curves downwards again towards the cremaster. The profile of the dorsum, after the swelling of the thorax, shows a straight line to the posterior edge of 4th abdominal segment, after which it slopes to the cremaster. Excepting on the appendage cases, the pupa is hairy. The hairs are light brown, short, and not very numerous. The eye parts, with the exception of the glazed eye, are hairy. On the top of the head the hairs curve forward, on the abdominal segments they are directed backward, and are more numerous and longer from the 4th abdominal segment to the cremaster. The thorax has not many hairs. They are shorter and scarcer on the ventral surface of abdominal segments than on the dorsum.

Total length 18 mm.; length of cremaster 1·6 mm.; from anterior extremity to apices of wing cases 12·2 mm.; width across eyes 3·6 mm.; across shoulders 5 mm.; across 3rd abdominal segment 5·6 mm.; depth of thorax 5 mm.; of 3rd abdominal segment 5·2 mm.

On May 10 the eyes had darkened, and the wing cases were of an opaque putty colour beneath their floury covering.

By May 20 the pupa was dark, and the wing cases showed the white markings of the imago on a black

ground. The glazed eye was quite black and the antennae cases dark. The butterfly should have emerged about this time, but after May 22 I concluded that it was dead. The abdomen had then shrunk considerably in length and girth. When I left Hyères for Algeria early in May, I had to remove the pupa from the tent in which it lay on the growing plant, and on the journey it probably suffered from want of moisture. The imago, as I found later, had fully formed but had died and dried up within the pupa case.

Explanation of Plate XLVII.

Fig. 1. Larva (magnified) of *Hesperia sidae*.
2. Pupa (natural size) of *Hesperia sidae*.